

GOLDSTONE 3.5-CM RADAR OBSERVATIONS OF THE 1995 MARS OPPOSITION; R. F. Jurgens, M. A. Slade, C. R. Franck, S. D. Howard, E. M. Standish, R. Winkler, D. Choate, R. Cormier, P. Dendrenos, R. Rose (JPL/Caltech, Pasadena, CA 91109-8099)

As part of the International Mars Watch, Goldstone radar observations of Mars were performed during the 1995 Opposition (~Dec.'94-March'95). While much of the allocated time was already devoted to observations for Mars Pathfinder landing site validation, a number of other tracks were performed for various other scientific objectives as outlined below. During this opposition, the sub-Earth latitudes are in Mars' Northern hemisphere (see Figure 1 below) over terrain not previously examined with current sensitivity. The radar data types possible in 1995 will be described. A good overview can be found in Chapter 20 of the book *Mars* (Keiffer *et al.*, ed.; 1992).

The gap in observations for the first three weeks in January, 1995, is due to the Goldstone 70-m antenna being out of service due to major repairs on the azimuth bearing structure. As shown by Figure 1, some of the interesting areas observed were the Olympus Mons region and the Elysium region. The value of using Mars radar topography in studying volcanic edifices has recently been shown by Zisk *et al.* (1992), in measuring regional slopes for Tyrrhena Patera. The 1995 Opposition has subradar topographic observations planned for the slopes and caldera of Olympus Mons, which also fortuitously cover the enigmatic volcano Jovis Tholus (which is poorly covered in Viking and Mariner 9 observations). Elysium Mons is too far north for radar topographic observations during this opposition, but the Albor Tholus volcano and surrounding terrain should be well covered.

Several topographic profiles cover the transition in albedo from Isidis Planitia to Syrtis Major, thus addressing questions about corresponding transitions in small-scale (cm-sized) surface roughness. Similar questions about the transition between Arabia Terra and southernmost Acidalia can be examined. Likewise, the tracks over Lunae Planum (and profiles across Kasei Vanes) may find topographic control over the albedo contrasts. Another issue in Lunae Planum and Arcadia Planitia is the question of the existence of elevation offsets across wrinkle ridges and measurement of regional slopes in these areas (Watters, 1991; Golombek *et al.*, 1991; Plescia, 1991, 1993).

Radar profiles across Martian craters may reveal characteristics of intracrater deposits that could constrain the origins of such deposits. Some of the interesting accessible craters are Becquerel, Rutherford, Trouvelot, and Radau. Radar topography has been useful in confirming some proposed sedimentary basins as regional topographic depressions (Goldspiel *et al.*, 1993).

The Mars 1995 dataset should provide a significant increase in the knowledge about the surface and subsurface of Mars.

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References: Goldspiel, J. M., S. W. Squyres, M. A. Slade, R. F. Jurgens, and S. H. Zisk, *Icarus*, 106, 346-364, 1993; Golombek, M. P., J. B. Plescia, and B. J. Franklin, *Proceedings LPSC XXI*, 679-693, 1991; *Mars* (edited by H. H. Keiffer, B. M. Jakosky, C. W. Snyder, and M. S. Matthews), University of Arizona Press, Tucson, 1992; Plescia, J. B., *Geophys. Res. Lett.* **18**, 913-916, 1991; Plescia, J. B., *J. Geophys. Res. Planets* **95**, 15,049-15,059, 1993; Watters, T. R., *J. Geophys. Res.* **96**, 15,599-15,616, 1991; Zisk, S. H., J. M. Mooginis-Mark, J. Goldspiel, M. A. Slade and R. F. Jurgens, *Icarus*, **96**, 226-233, 1992.

Radar Tracks During 1995 Mars Opposition

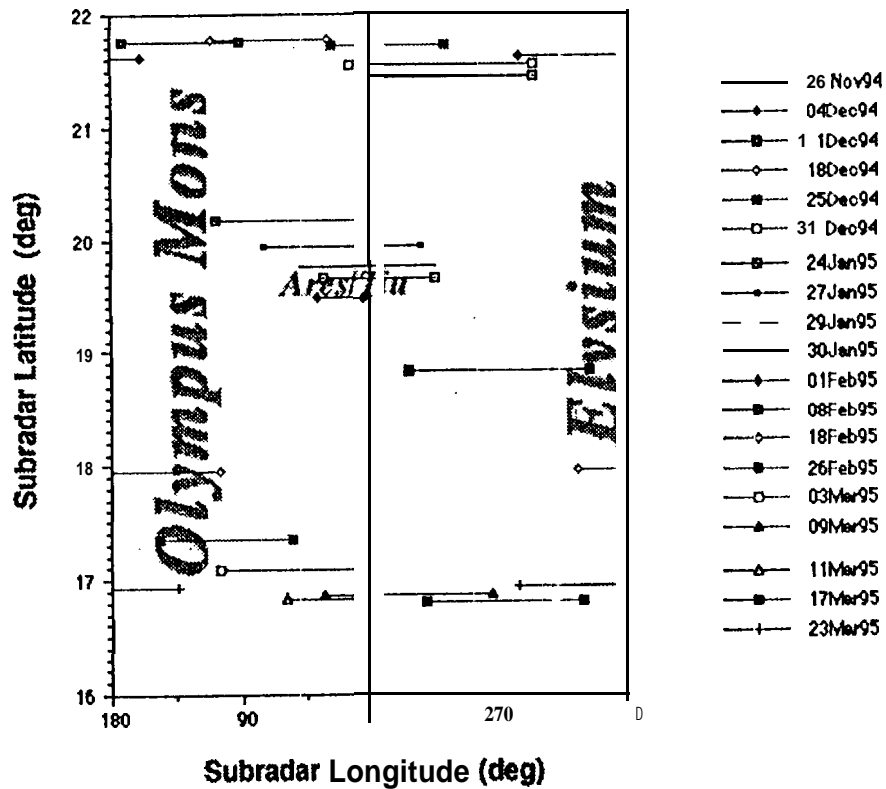


Fig. 1